JOURNAL OF THE FRANKLIN INSTITUTE.

Vol. CXVII.

INDEX.

Acclimation, Vegetable..... 225
Analogy between Allotropic Phosphorus and Arsenic..... 224
Ancient Metallic Architecture..... 460
African Sea, Interior..... 386
Arsenic in Wines..... 469
Aurora Borealis at Behring's Strait..... 466
Auroras, Artificial..... 5
Aurora, Studies of the..... 209

Benzine, Distillation of..... 278
Bilgram, Hugo, Equilibrium of a Liquid Mass..... 72
Bi-Sulphide of Carbon, Solidification of..... 389
Bond, George M., Standards of Length and their Subdivision.....281, 357
" " Standards of Length as Applied to Gauge Dimensions..... 368

Book Notices:
Galvanoplastic Manipulations (Wahl)..... 73
Eleventh Book of Specimens of Printing Types, etc., (MacKellar, Smiths & Jordan)..... 75
The American Printer. (The same)..... 75
Explosive Materials. (Berthelot)..... 76
The Materials of Engineering. (Thurston)..... 77
Kinematics; or, Mechanical Movements. (MacCord)..... 233
Electricity, Magnetism and Electric Telegraphy. (Lockwood)... 235
Saturated Steam, the Motive Power in Earthquakes and Volcanoes. (Peacock)..... 236
Electricity in Theory and Practice. (Fiske)..... 237
Traité Practique d'Electricité comprenant les Applications aux Science et l'Industrie, etc. (Gariel)..... 315
Dynamic Electricity. (Hopkinson, Schoolbred, Day)..... 316
Hints on the Drainage and Sewerage of Dwellings. (Gerhard)... 389
The Air We Breathe and Ventilation. (Mott)..... 390
Books added to Library, October to December, 1883.....229, 391, 474

Brass, Forgeable 70
Brass, History of 467
Bricks, Dilapidation of 463
British Patents, Designs and Trade-Marks Act of 1883, etc. By G. Morgan Eldridge 199
Bronzes, Locating the Strongest of the. By Ernest H. Jobbins, 88, 184, 260

Cannons of Silk and Steel 48
Cast Iron in Steam Boilers. By S. Lloyd Wiegand 207, 279, 348
Celestial Photography 151
Cement (Port'and), Strength of 312
Chase, Pliny Earle, The Sun-Earth Balance 355
Cheapest Point of Cut-off, Marks, Wood 5, 81, 321, 401
Chinese Telegraphs 70
Church, I. P., the Alleged Remarkable Error in the Theory of the Turbine Water Wheel 333
Clark, N. B., Petroleum as a Source of Emergency for War Ships 341
" " Water-Line Defence and Gun Shields for Cruisers 20, 104
Cleansing Old Paintings 249
Colorific Rays, Solution of 386
Color of Precious Stones 69
Comets, Origin and Periodicity of 225
Comets' Tails, Forms of 302
Compound Engines, Economy of. By Wm. Dennis Marks 36, 295
Condensation (Initial) of Steam Cylinders. By Wm. Dennis Marks, 173, 250
Condensation of Steam in Pipes and Cylinders of Steam Engines, etc. By Wm. Dennis Marks 1
Congelation of Solvents 465
Contagion, Nervous and Intellectual 226
Correspondence:
Bilgram, Hugo, Equilibrium of a Liquid Mass 72
D'Auria, L., Equilibrium of a Liquid Mass 228
Wood, De Volson, Second Law of Thermodynamics 228
Critical Point of Liquefiable Gases 332
Cut-off, Cheapest Point of (Marks, Wood) 5, 81, 321, 401
Cylinders (Steam), Initial Condensation of. By Wm. Dennis Marks 173

D'Auria, L. Ellipticity of Planets 428
Delany Synchronous-Multiplex Telegraph. By Edwin J. Houston 49
Delauney's Earthquake Predictions 464
Drawing School, Annual Report of the Director for Sessions of 1883–1884 471
Duboscq, Jules 19

Earthenware, Dangerous 314
Earthquake, Predictions, Delauney's 464
Earthquakes, Cause of 464

Economy of Compound Engines. By Wm. Dennis Marks.....36, 295
Eldridge, G. Morgan, The British Patents, Designs and Trade-Marks Act of 1883, in its relation to American Inventors..... 199
Electric Aërostat..... 465
Electric Lamp, Semi-Incandescent..... 468
Electric Equilibrium..... 462
Electric Photophore, Frontal..... 462
Electrical Exhibition, International..... 316
Ellipticity of Planets. By L. D'Auria..... 428
Encke's Comet..... 172
Examination of Steam Engineers, Proposed Ordinance for the..... 143
Exhibition, International Electrical..... 316
Explosions (Boiler), Protection from..... 68
Explosive Waves, Propagation of..... 387
Explosive Waves..... 462

Forgeable Brass..... 70
Franklin Institute—Drawing School, Annual Report of..... 471
" " International Electrical Exhibition..... 316
" " List of Books added to the Library, October to December, 1883.....229, 391, 474
" " Proceedings of Stated Meetings..78, 151, 238, 319, 400, 470
Flint Weapons, Modern..... 461
Frazer, Persifor, Reply to T. D. Rand's Paper on Geology of Chester Valley, etc..... 303

Galvanizing Brass and Iron..... 340
Geology of Chester Valley and Vicinity, etc. Discussion thereon between T. D. Rand and Persifor Frazer..... 303
Glass-Blowing (Mechanical)..... 224
Glass, Phosphoric..... 227
Grimshaw, Robert. Doctoring Indicator Cards..... 354
" " Hanging the Levers for Indication..... 350
" " To Chicago in Eighteen Hours..... 431

Hanging the Levers for Indication. By Robert Grimshaw..... 350
Harmonies, Natural..... 463
Hedges, Crab-Apple..... 461
Heat Developed by Forging..... 311
Hieroglyphics, Polynesian..... 427
Hoadley, J. C. A Tilting Water-Meter for Experimental Purposes..... 273
Houston, Edwin J. The Delany Synchronous-Multiplex System of Telegraphy..... 49

Illuminating Gas, Injurious Effects of..... 356
Indicator Cards, Doctoring. By Robert Grimshaw..... 354
Industry (New), in Madrid..... 72
Initial Condensation of Steam Cylinders. By Wm. Dennis Marks..173, 250
Indicating Telegraph Wires, New Method of..... 349

Interior of the Globe 388
Isomorphism, Modification of the Law of 225

Jobbins, Ernest H. An Investigation Locating the Strongest of the Bronzes 88, 184, 260

Liquefaction of Gases 389
Losses by Condensation of the Steam per Horse-Power per Hour in Cylinders and Pipes of Steam Engines. By Wm. Dennis Marks 1
Ludlow, William, Surveys for the Future Water Supply of Philadelphia 453

Marks, Wm. Dennis. Cheapest Point of Cut-off ..... 8', 401
" " " Economy of Compound Engines 36, 295
" " " Initial Condensation of Steam Cylinders 173, 250
" " " Note on the Losses per Horse-Power per Hour by Condensation of the Steam in Pipes and Cylinders of Steam Engines 1
Metallization of Wood 226
Mechanics, A Lecture. By Coleman Sellers 161, 241
Metallic Architecture, Ancient 460
Meteoric Dust 388
Mining Powder, New 315

Nickel, Electro-Plating with. By William H. Wahl 124, 210

Observations on the Pic du Midi 466
Oxycitric Acid 226
Oxygen, Critical Temperature and Pressure of 223
" Density of Liquid 223

Paintings, Preservation of, in the Parisian Opera House 67
Paint, New 459
Parchment-Paper Packings 460
Petroleum as a Source of Emergency Power for War Ships. By N. B. Clark 341
Phonic Wheel Applications of 469
Phosphorus (Allotropic) and Arsenic, Analogy between 224
Phosphorus, Black 222
Photography, Celestial 151
Photophore, Electric 462
Polarized Light, Examinations of Sugar with 71
Precious Stones, Color of 69
Preservation of Paintings in the Parisian Opera House 67
Prime Meridian, Choice of a 227
Progress in Science and Industry, A Summary of, from the Secretary's Report 134

Selenotropism 71
Sellers, Coleman. A lecture on Mechanics 161, 241
Semi-Incandescent Electric Lamp 468
Sensitive Thermometer 103

Sinking Shafts in Quicksands..... 461
Slow Movements of the Soil..... 467
Soda from Sea Salt, Manufacture of..... 313
Solar Energy, Circulation of..... 35
Solar Protuberances..... 465
Solidification of Bi-Sulphide of Carbon..... 389
Sounds, Upper Limit of Audible..... 68
Spectral Rays, Analysis of..... 359
Spectroscope Phenomena, Interpretation of..... 468
Standards of Length as applied to Gauge Dimensions. By George M. Bond..... 368
Standards of Length and their Subdivision. By George M. Bond..... 281
Steam Engineers, Proposed Ordinance for the Examination of..... 143
Strongest of the Bronzes, Locating the. By Ernest H. Jobbins..88, 184, 260
Sugar, Examination of, with Polarized Light..... 71
Sugar Beets, Selection of Seeds for..... 71
Sun-Earth Balance (The). By Pliny Earle Chase..... 355

Tanning Linen..... 387
Telegraph Wires, Underground..... 460
Telegraphs, Chinese..... 70
Telegraphy, The Delany Synchronous-Multiplex System of. By Edwin J. Houston..... 49
Telephone, Principle of the..... 228
Telephone, Calling Dogs by..... 460
Thermometer, Sensitive..... 103
Thevenin's Theorem..... 272
Thurston, Robert H., The Theory of Turbines..... 6
"To Chicago in 18 Hours." By Robert Grimshaw..... 431
Tripolith..... 312
Turbine Water-Wheel, Alleged Remarkable Error in the Theory of. By I. P. Church..... 333
Turbines. By DeVolson Wood..... 412
Turbines, Theory of. By R. H. Thurston..... 6

Units, Mechanical and Physical..... 69
Underground Telegraph Wires..... 460
Upper Limit of Audible Sounds..... 68

Wahl, William H., Electro-Plating with Nickel.....124, 210
" " A Summary of Progress in Science and Industry.. 134
Water-Line Defence and Gun Shields for Cruisers. By N. B. Clark.20, 104
Water-Meter, A Tilting, for Experimental Purposes. By J. C. Hoadley. 273
Water Pipes, Protection of, Against Rupture..... 72
Water Supply of Philadelphia (Future) Surveys for the..... 453
Waterproof Clothing..... 470
Wiegand, S. Lloyd, Cast-iron in Steam Boilers.....207, 279, 348
Wood, DeVolson, Cheapest Point of Cut-off.....5, 321
Wood, DeVolson, Turbines..... 412